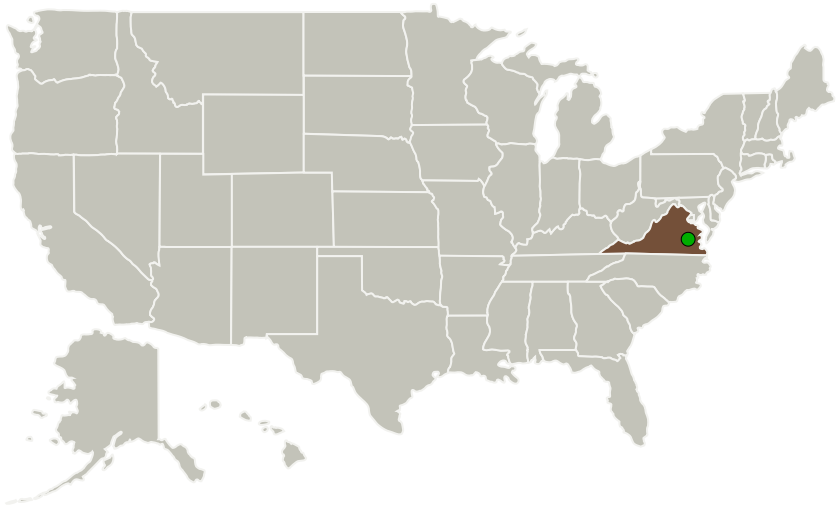
Development of a Computed Tomography Simulator: SimCT, Application to Health Monitoring and Remaining Life Assessment, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

The objective of this activity is to develop a quantitative NDE simulation tool for computed tomography suitable for desktop work using realistic geometry descriptions of complex anisotropic geometry. The increasing demands on NDE to address inspection reliability in the area of health monitoring and remaining life assessment demand that quantitative engineering tools be available so that cost effect engineering analysis on inspectibility limits and optimal inspection protocols be done. Most NDE techniques, as they move to a more digital format, generate terabytes of data for a single scan. X-ray methods generally have high computational needs. Until recently extracting information from massive data sets was impossible due to limited computation capabilities. By applying the emerging massively parallel graphic processing cards (GPU) to a CT simulation, SimCT, we have a means to address the quantitative modeling in an important NDE method needed to characterize materials in support of health monitoring activities. The computational techniques using GPU platforms and the data analysis methods developed in the x-ray area apply to any NDE method. This R&D effort will develop a GPU implementation of the key subroutine in SimCT and demonstrate the capability to handle NDE simulation needs using complex geometry in near real time.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Nde Technologies, Inc.	Lead Organization	Industry	Charlottesville, Virginia
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations
Virginia

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138087)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Nde Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

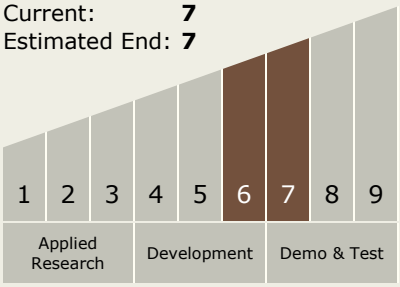
Carlos Torrez

Principal Investigator:

Irving Gray

Technology Maturity (TRL)

Start: **6**
Current: **7**
Estimated End: **7**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.4 Manufacturing
    - TX12.4.5 Nondestructive Evaluation and Sensors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System